

Claims

1. A smart card comprising:
- (i) a substrate (102),
 - (ii) one or more integrated circuit mounted integrally with the substrate (102),
 - (iii) interface means including a serial data interface circuit operable to send and/or receive data as a single bit-width data stream, the interface means being arranged to permit data stored in the integrated circuit to be accessed via the serial data interface circuit, and
 - (iv) electrical contact means (103) provided on the substrate surface and adapted to provide electrical contact with a smart card reader, the contact means having first and second contact areas (104, 105; 1020, 1021) each containing a plurality of contact pads electrically coupled to the serial interface circuit, and each contact area being arranged to be usable independently of the other area, the first and second contact areas (104, 105; 1020, 1021) being immediately adjacent and non-overlapping.
2. A smart card as claimed in claim 1 wherein the or each integrated circuit is positioned below said contact means.
- ~~3. A smart card as claimed in claim 1 or claim 2 wherein the first and second contact areas each comprise a respective set of eight separate electrically conductive contact pads (1-8; 9-13), each set being communicatively coupled to the serial data interface circuit.~~
4. A smart card as claimed in any preceding claim wherein the serial data interface operates in conformity with the ISO 7816 standard.
5. A smart card as claimed in any preceding claim wherein the contact means includes a plurality of separate electrically conductive pads (a, b) forming respective ground connections of the serial data interface circuit.
6. A smart card as claimed in claim 7 wherein said ground connections (a, b) are electrically interconnected.

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7. ~~A smart card as claimed in claim 5 or claim 6, wherein the ground connections (a, b) extend over the surface of the substrate (102) between the first and second contact areas (104, 105).~~
8. A smart card as claimed in any preceding claim which comprises a plurality of said interface means.
9. A smart card as claimed in claim 8 comprising two contact means (301, 302), located at different ends and on different sides of the smart card.
10. A smart card as claimed in any preceding claim wherein the substrate (103) is incorporated into a three dimensional structure selected from a cylinder, a sphere, and a cone.
11. A smart card reader/writer for reading data and/or writing data to the smart card of any of claims 1 to 10, comprising electrical contact means adapted to provide an electrical contact with the smart card in use and interface means adapted to communicate data via said first and second contact areas via the electrical contact means.
12. A smart card reader/writer as claimed in claim 11 when dependent from any of claims 6 to 7, further comprising detector means, said detector means being arranged to detect whether a smart card comprises a pair of connected ground connections.
13. A smart card reader/writer as claimed in claim 12 wherein the interface means is arranged only to communicate via the second contact area if the detector means detects a smart card which comprises a pair of connected ground connections.
14. ~~A smart card reader/writer as claimed in any of claims 11 to 13 wherein said electrical contact means comprises at least sixteen electrical contact pins.~~
15. A smart card reader/writer as claimed in any of claims 11 to 14 wherein said electrical contact means comprises at least two ground contact pins each arranged to form a ground connection with a respective contact area of the smart card in use.

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16. A method of reading data from or writing data to a smart card using a smart card reader/writer as claimed in any of claims 11 to 15 said method comprising the steps of:

- (i) inserting said smart card into said smart card reader/writer;
- (ii) checking that a PIN accessed by said reader/writer is the same as a PIN stored on said smart card and if so;
- (iii) reading a key from a first serial data interface of said smart card and using said key to gain access to a second data interface of said smart card.

17. An adaptor comprising:-

- (i) a smart card as claimed in any of claims 1 to 10 forming a first interface and arranged to allow communication between said adaptor card and a smart card reader/writer,
- (ii) a second interface arranged to allow communication between said adaptor card and another device in use; and
- (iii) a converter operable to convert data between formats suitable for said first and second interfaces.

18. An adaptor according to claim 17, wherein the second interface is an interface such as a PCMCIA card interface, a smart media card interface, a MMC interface, a USB interface, and RS232 interface or an IEEE488 interface.

19. An electronic book comprising visual display means and arranged to communicate with the smart card of any of claims 1 to 10.

20. An electronic book comprising visual display means and a smart card reader as claimed in any of claims 11 to 15.

21. A portable, hand-held audio player comprising loudspeaker means and a smart card reader as claimed in any of claims 11 to 15.